

SECTIONS OF STRATA BELONGING TO THE "BEAR RIVER GROUP," NEAR
BEAR RIVER CITY, WYOMING TERRITORY.

BY F. V. HAYDEN, M. D.

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During my explorations along the line of the Union Pacific Railroad, last autumn, my attention was attracted by two of the most remarkable artificial cuts or excavations that I have ever seen in the West. They are located about a mile west of Bear River City, or nearly 950 miles west of Omaha. No such exhibitions of the strata can be found in the country, formed by natural causes. Usually the rocks of the modern formations are composed of such soft materials that they have readily decomposed on the surface, covering it with a considerable thickness of debris, thus concealing, in many instances, not only the true character of the underlying rocks, but also many of the details of the stratification.

At my request, Mr. H. R. Durkee, an excellent civil engineer, residing at Bear River City, made a careful survey of the cuts, and noted the character of each layer, with its thickness in feet and inches. Some of the layers are so crowded with fresh water shells that they seem almost made up of them. A list of them is given in Mr. Meek's Catalogue.

Upon the surrounding hills, among the debris rock from these beds, the fossil shells are so abundant that they may be gathered by the bushel, like nuts in autumn, in a fine state of preservation. The strata are all regarded as of lower Tertiary age, and belong to what I have denominated the Bear River Group. All the beds in this vicinity are very much disturbed, holding a nearly vertical position, or inclining at a high angle. I desire to call the attention of scientific men to these sections as they travel along this portion of the road, and for that reason I regard them of some value. I shall hereafter work up the geology of this district more in detail, and simply wish to make a record of these facts at the present time.

COMMENCING AT THE EASTERN EXTREMITY OF THE CUT.

| No. | Description. | Feet. | In. |
|-----|--|-------|-----|
| 1. | Clay, Greyish, Black, contains fragments of sandstone, | 10 | |
| 2. | Limestone, Blue, | 2 | |
| 3. | Clay, Greyish-black, | | 6 |
| 4. | Clay, Brown, hard, and in large fragments, | 1 | |
| 5. | Clay, Black, " " small " | 1 | |
| 6. | Limestone, Blue, Fossiliferous, | 1 | 6 |
| 7. | Clay, Greyish-black, | 1 | 2 |
| 8. | Sandstone, Fragmentary, | | 2 |
| 9. | Clay shale, Grey, | 1 | |
| 10. | Clay, Greyish-black, very compact. | 1 | |
| 11. | Clay shale, Black, | | 10 |
| 12. | Marl, shells in fragments, | | 8 |
| 13. | Clay shale, Black, | | 6 |
| 14. | Limestone, much shattered, and in angular pieces, | 2 | |

| No. | Description. | Feet. | In. |
|-----|---|-------|-----|
| 15. | Clay shale, Black, | | 10 |
| 16. | Limestone, angular fragments, | | 6 |
| 17. | Clay shale, Brown, | | |
| 18. | Limestone, slightly fossiliferous, | 1 | 6 |
| 19. | Gypseous Earth, contains crystals of Selenite, | | 3 |
| 20. | White Marl, shells fragmentary, | 1 | |
| 21. | Limestone, very fossiliferous, | | 6 |
| 22. | Clay shale, Black, | 1 | 4 |
| 23. | Limestone, very fossiliferous, | | 2 |
| 24. | Clay shale, Brown, | 2 | 6 |
| 25. | Sandstone, Fragmentary, | 4 | |
| 26. | Clay shale, Grey-black, | 2 | |
| 27. | Gypseous earth, layer of crystals of Selenite on E. side, | | 6 |
| 28. | Clay shale, contains streak of coal and Gypseous earth, | 2 | 6 |
| 29. | Gypseous earth, contains streaks of brown bituminous shale, | | 8 |
| 30. | Clay shale, Brown, very hard, | 1 | 6 |
| 31. | “ Black, Bituminous, | | 5 |
| 32. | Marl, Grey, | | 2 |
| 33. | Limestone, | | 10 |
| 34. | Clay, full of fossils, | | 3 |
| 35. | Clay shale, Grey, | 1 | |
| 36. | “ Blue, | | 3 |
| 37. | Sand. Yellow, | | 2 |
| 38. | Clay shale, Grey, | 1 | |
| 39. | “ “ Bituminous, | | 8 |
| 40. | Limestone, Fossiliferous, | | 6 |
| 41. | Clay shale and marl, Fossiliferous, less foss. on W. side, | 1 | 6 |
| 42. | Bituminous shale, contains streaks black coal, | | 4 |
| 43. | Clay shale, Blue, | | 6 |
| 44. | Gypseous Earth, | | 1½ |
| 45. | Clay shale, Blue, | | 1 |
| 46. | Marl, | | 4 |
| 47. | Clay shale, Blue, | 1 | |
| 48. | Marl, Yellowish-white, | | 3 |
| 49. | Sandstone, Fossiliferous, | | 9 |
| 50. | Clay shale, Blue, | 1 | 2 |
| 51. | Sandstone, Fragmentary, | | 8 |
| 52. | Clay shale, Blue and Yellow, | | 6 |
| 53. | Limestone, very fossiliferous, | | 6 |
| 54. | Clay, full of fossils, | | 2 |
| 55. | Bands, Black, bituminous shale and marl, | 2 | 6 |
| 56. | Marl, | | 5 |
| 57. | Slaty shale, Black, | | 6 |
| 58. | Limestone, very fossiliferous, | | 3 |

| No. | Description. | Feet. | In. |
|------|--|-------|-----|
| 59. | Slaty shale, Grey, | | 10 |
| 60. | Shale, full of fossils, | 1 | |
| 61. | Clay shale, Black, | | 8 |
| 62. | “ Yellowish-brown, | | 6 |
| 63. | “ Blue, | | 6 |
| 64. | Coal and yellow shale in streaks, | | 10 |
| 65. | Limestone, very fossiliferous, | 1 | |
| 66. | Marl, | 1 | |
| 67. | Limestone, slightly foss., fossils fragmentary, | 1 | 6 |
| 68. | Nodular clay and shells, streaks bituminous shale on W. side, | | 10 |
| 69. | Marl, Yellow, hard, | | 4 |
| 70. | Marl, Black, soft, | | 5 |
| 71. | Clay shale, Black bituminous, | 1 | 6 |
| 72. | Gypseous earth, yellow and white, | | 2½ |
| 73. | Marl, hard, | | 4 |
| 74. | “ soft, | | 8 |
| 75. | Clay shale, Grey, | 1 | |
| 76. | Clay and shale in bands, | 1 | |
| 77. | Marl, | 2 | |
| 78. | Gypseous earth, Yellow, | | 1 |
| 79. | Marl, | 2 | 6 |
| 80. | Clay shale, Black and Blue, in bands, | 4 | |
| 81. | Clay, stony, Grey, | 2 | |
| 82. | Gypseous earth, Yellow, | | 3 |
| 83. | Limestone, fossiliferous, fossils small, | 1 | 8 |
| 84. | Gypseous earth, white, | | 2 |
| 85. | Clay, stony, Bluish-gray, | 2 | 6 |
| 86. | Clay shale, Black, | | 10 |
| 87. | Limestone fossiliferous, | | 8 |
| 88. | Clay shale, Black, | | 3 |
| 89. | Limestone, | | 4 |
| 90. | Marly clay, Black, | | 2 |
| 91. | Marl, Light grey, | | 2½ |
| 92. | Clay shale, “ | | 4 |
| 93. | “ Black, | | 4 |
| 94. | “ Grey, | | 6 |
| 95. | “ Black, | | 2 |
| 96. | Gypseous earth, Yellow, | | 2 |
| 97. | Clay shale, Black, | | 4 |
| 98. | Gypseous earth, Yellow, | | 3½ |
| 99. | Limestone, | 1 | 6 |
| 100. | Clay shale, Blue, | 1 | |
| 101. | Limestone. | | 8 |
| 102. | Clay shale, Blue, | | 8 |
| 103. | Limestone, | 1 | 8 |

| No. | Description. | Feet. | In. |
|------|--|-------|-----|
| 104. | Marl, Grey, | | 6 |
| 105. | Shale, Black, | | 2 |
| 106. | Sandstone, | | 3½ |
| 107. | Marl, | | 3 |
| 108. | Shale, Black, | | 4 |
| 109. | Marl, | 2 | |
| 110. | Shale, Bituminous, | | 1 |
| 111. | Marl, | | 2 |
| 112. | Limestone, | | 8 |
| 113. | Marl, | | 5 |
| 114. | Limestone, | | 6 |
| 115. | Marl, | 1 | |
| 116. | Shale, Black, | 1 | |
| 117. | Coal and Shale, | | 2 |
| 118. | Limestone, | | 11 |
| 118. | Marl, | | 6 |
| 120. | Limestone, | | 10 |
| 121. | Marl, | 1 | 6 |
| 122. | Clay shale, variegated (Purple, Yellow, &c.) | | 9 |
| 123. | Limestone, slightly fossiliferous, | | 3 |
| 124. | Gypseous earth, | | 6 |
| 125. | Limestone, slightly fossiliferous, | | 4 |
| 136. | Marl, Bluish-black, hard, | | 2 |
| 127. | Coal, | | ¼ |
| 128. | Gypseous earth, | | 3 |
| 129. | Coal, | | ¼ |
| 130. | Limestone, | 1 | |
| 131. | Marl and coal, | | 2 |
| 132. | Limestone, | | 7 |
| 133. | Shale, Bituminous, Black, | | 10 |
| 134. | Marl, hard, | | 4 |
| 135. | Shale, Black, | | 1 |
| 136. | Marl. | 2 | |
| 137. | Shale, | | 1 |
| 138. | Limestone, very fossiliferous, | | 4 |
| 139. | Clay shale, Blue, full of fossils, | 1 | |
| 140. | Shale, Bituminous, Yellow and Black, | | 3 |
| 141. | Limestone, | 2 | 6 |
| 142. | Shale, Slaty, Black, | | 6 |
| 143. | “ Brown, full of fossils, | | 3 |
| 144. | “ Blue, | | 7 |
| 145. | Marl, | | 3½ |
| 146. | Gypseous earth, | | 1 |
| 147. | Limestone, compact, streaks of marl and coal, which run out, | 3 | 6 |
| 148. | Shale, Slaty, | 1 | 2 |

| No. | Description. | Feet. | In. |
|------|--|-------|-----|
| 149. | Bituminous shale and Brown coal, | | 8 |
| 150. | Limestone, | 1 | |
| 151. | Clay shale, contains scales of white Gypseous earth, | 1 | 10 |
| 152. | Marl, hard, | | 3 |
| 153. | Shale, fossiliferous, | 2 | |
| 154. | Clay, hard, fossiliferous, | | 8 |
| 155. | Clay shale, Black, | | 1½ |
| 156. | Clay, hard, fossiliferous, | | 4 |
| 157. | Marl, Grey, | | 6 |
| 158. | “ Black, | | 2 |
| 159. | Gypseous earth, White, | | 8 |
| 160. | Clay, hard, | | 8 |
| 161. | Marl, | | 1 |
| 162. | Coal, Brown, | | 6 |
| 163. | Clay, | | 2 |
| 164. | Limestone, | 3 | |
| 165. | Gypseous earth and shale, | 2 | |
| 166. | Limestone, | 1 | 6 |
| 167. | Sandstone, Yellow, | | 2 |
| 168. | Limestone, | 1 | |
| 169. | Gypseous earth and shale, | | 8 |
| 170. | Limestone, | 1 | |
| 171. | Clay shale, | 3 | |
| 172. | Bituminous shale, | | 4 |
| 173. | Limestone, | 2 | |

From No. 173 to western end of cut (which is made up of the reversed strata, but not in regular order, some seem to be pinched out).

ORDER OF STRATA EXPOSED IN RAILROAD CUT No. 2.

(FROM EAST TO WEST.)

| No. | Description. | Feet. |
|-----|---|-------|
| 1. | Drift, steel colored, | 15 |
| 2. | Sandstone, White, | 12 |
| 3. | “ Yellow, containing fragments, No. 2, | 1.5 |
| 4. | Shale, arenaceous, Brown, | 9.5 |
| 5. | Sandstone, coarse, yellow, in layers, | 1 |
| 6. | “ fine, “ in thin layers, | 1.5 |
| 7. | “ coarse, containing irregular streaks of brown shale, which contains coal in fragments, | 2.5 |
| 8. | “ fine, white, | 18 |
| 9. | “ brown, contains brown marks resembling bark and branches, | .25 |
| 10. | “ Steel grey, contains streaks of No. 9, | 40 |
| 11. | Shale, Black, and sandstone, steel grey, | 1 |
| 12. | Sandstone, Fine, white, | 4 |
| 13. | “ in thin layers of variegated colors, | 6 |
| 14. | “ in broad “ “ | 21 |

| No. | Feet. |
|---|-------|
| 15. Sandstone, steel grey, | 12 |
| 16. " in thin layers of variegated colors, | 5 |
| 17. " steel grey, in layers (contains streaks of coarser yellow in layers), | 35 |
| 18. Shale, Brown, | 2 |
| 19. Sandstone, Yellow, | 6 |
| 20. Shale, Brown, | 1 |
| 21. Sandstone, Steel grey, | 40 |
| 22. " White, | 6 |
| 23. Sandstone, Grey, | 4 |
| 24. Shale, earthy, Black, | 1 |
| 25. Gypseous earth, Yellow, | .5 |
| 26. Shale, Black, | .5 |
| 27. Sandstone, contains shells in fragments, | 15 |
| 28. Shale, Brown, | 1 |
| 29. Clay, marly, | 1.5 |
| 30. Sandstone, Yellow, | 30 |
| 31. Shales and clays, earthy, | 25 |
| 32. Shale, Brown, | 6 |
| 33. Sandstone and Gypseous earth, | 20 |
| 34. Shale, Bituminous, | 1 |
| 35. Gypseous earth, | 3 |
| 36. Sandstone, yellow, | 10 |
| 37. " white, | 8 |
| 38. Marl, contains shells, | 6 |
| 39. Gypseous earth, | 2 |
| To end of Cut, Shale, clay, and arenaceous Gypseous earth, | 60 |
| Length of cut, 440 feet. | |

A PRELIMINARY LIST OF FOSSILS, COLLECTED BY DR. HAYDEN IN COLORADO, NEW MEXICO AND CALIFORNIA, WITH BRIEF DESCRIPTIONS OF A FEW OF THE NEW SPECIES.

BY F. B. MEEK.

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SILURIAN SPECIES.

Camp Creek Cañon, Colorado City.

1. *Orthis Coloradoensis*. Meek.

A small, compressed, nearly equivalve, subsemicircular species, much widest on the hinge line, which is sometimes abruptly produced into lateral auricles. Dorsal valve less convex than the other, and having a shallow, rather wide, mesial sinus, rapidly narrowing to the beak, which does not project beyond the hinge line. Ventral valve depressed convex, with cardinal area rather low, flat, inclined backward, and sharply defined to